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10/580,678	01/25/2007	Marcel Bouffier	12928/10030	5728
23280	7590	11/03/2009		
Davidson, Davidson & Kappel, LLC			EXAMINER	
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New York, NY 10018				
			ART UNIT	PAPER NUMBER
			3663	
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			11/03/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/580,678

**Applicant(s)**

BOUFFIER, MARCEL

**Examiner**

Rick Palabrica

**Art Unit**

3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 25 September 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 12-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 9/25/09, which directly amended claims 12, 13, 22, 23 and 24 (duplicated), added new claims 26-29, and traversed the rejection of claims in the 4/23/09 Office action, has been entered.

Applicant's arguments with respect to the rejected claims have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 12-15, and 21-28 are rejected under 35 U.S.C. 102(b) as being anticipated by Hesketh et al. (WO 01/50477) who disclose a fuel assembly for a pressurized water nuclear reactor (e.g., see Figs. 1-4).

As to claim 12, Hesketh et al. disclose fuel rods 1 which are arranged at nodes of a substantially regular network having a polygonal outer contour (see Fig. 1). They disclose that these fuel rods are used in PWR nuclear power plants (see page 5, lines 19+). PWRs inherently use enriched uranium dioxide fuel rods for increased fission efficiency.

As to the fuel rods "not containing any plutonium before the assembly is used in a reactor", Hesketh et al. disclose that their fuel rods can be used in a core that

*"may include mixed oxide fuel assemblies and uranium dioxide fuel assemblies"  
Underlining provided. See page 5, 8<sup>th</sup> full paragraph.*

Unlike mixed oxide fuel assemblies, uranium dioxide fuel assemblies do not contain plutonium prior to use in a reactor.

As to the claimed groups of rods having different levels of nuclear reactivity Hesketh et al. disclose an embodiment shown in Fig. 4 that meets the claim limitations. Applicant's claim language reads on said embodiment of Hesketh et al. as follows: a) "first central group" reads on rods 55; b) "second group" reads on rods 60; c) "third group" reads on rods 50.

Rods 55 (first central group) have the largest diameter and therefore have the highest level (i.e., first level) of nuclear reactivity. Rods 60 (second group) have the intermediate diameter and therefore have a reactivity less than the highest (or first level) of reactivity. Rods 50 (third group), which are arranged at the corners of the outer contour of the assembly have the smallest diameter and therefore have a reactivity strictly less than the intermediate diameter rods (rods 60).

As to claim 22, Hesketh et al. disclose that the core can have one or more of their fuel assemblies (see page 5, 6<sup>th</sup> full paragraph).

As to claims 13 and 23, the examiner interprets "neutron contaminant" as neutron poison or neutron absorber. The fuel rods in Hesketh et al. inherently include neutron poison/absorber, e.g., non-uranium elements or impurities in the fuel material, or fission products that are inherently produced when the rods are used during operation of the nuclear reactor.

As to claim 14, the second group (i.e., rods 60) extends, for each of the faces of the outer contour of the network of rods, and the third group (i.e., rods 50 comprises only the fuel rods at the corners of the outer contour.

As to claim 15, Hesketh et al. meet the claim limitation because the masses of uranium 235 in the three groups of rods are different because of the diameter of rods in one group is different from the diameter of rods in another group.

As to claim 21, the fuel rod network in Hesketh et al. has a square outer contour (see Fig. 1).

As to claims 24 and 25, see Fig. 1.

As to claim 26, see page 2, 6<sup>th</sup> paragraph.

As to claims 27 and 28, see page 2, last paragraph.

The claims are replete with statements that are either essentially method limitations or statements of intended or desired use. For example, "for a pressurized water reactor," "for receiving rods of a control rod cluster", etc. These clauses, as well as other statements of intended use do not serve to patently distinguish the claimed

structure over that of the reference, as long as the structure of the cited references is capable of performing the intended use. See MPEP 2111-2115.

See also MPEP 2114 that states:

A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647.

Claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Denly, 263 F.2d 844, 847, 120 USPQ 528, 531.

[A]pparatus claims cover what a device is, not what a device does." Hewlett-Packard Co. v. Bausch & Lomb Inc., 15 USPQ2d 1525, 1528.

As set forth in MPEP 2115, a recitation in a claim to the material or article worked upon does not serve to limit an apparatus claim.

The system in the cited reference is capable of being used in the same manner and for the intended or desired use as the claimed invention. Note that it is sufficient to show that said capability exists, which is the case for the cited reference.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12-15 and 21-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hesketh et al. either alone or in view of either one of Millot (U.S. 4,652,416) or Ferrari et al. (U.S. 4,326,922)

In section 2 above, the examiner stated that pressurized water reactors inherently use fuel elements of enriched uranium dioxide. If applicant is of a different opinion, the claims are still unpatentable because it would have been obvious to an artisan to use said enriched fuel in Hesketh et al. for increased fission efficiency. If applicant is still of a different opinion, then either one of Millot et al. or Ferrari et al. teach that it is old and advantageous to use enriched uranium oxide for the fuel assemblies of a pressurized water reactor (see Abstract in Millot or col. 4, lines 1+ in Ferrari et al.).

4. Claims 16-20 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hesketh et al. either alone or in view of Delafosse (U.S. 4,224,106).

As to claims 16 and 17, it is a notorious scientific fact that the reactivity of a fuel rod can be set either by the amount (or mass) of uranium 235 or the enrichment of uranium 235. Therefore, whether the reactivity is obtained by different masses or different enrichment of uranium 235 is either a design choice or a constraint imposed by the utility-operator of the reactor. If applicant disagrees, then Delafosse, who teaches that mass of uranium is related to enrichment, confirms the examiner's statement (see col. 3, lines 6+ in Delafosse).

As to claims 18-20, the specific levels of enrichment of the groups of fuel rods are matters of design and/or optimization. The enrichment depends upon constraints that include the required power level, burn-up, and fuel management scheme that the utility adopts for the reactor. Additionally, the selected enrichment levels have to be

optimized in order for the reactor to generate the maximum energy output at the lowest possible cost.

See MPEP 2144.05 II.A as to matters of optimization within prior art conditions or through routine experimentation.

Note also that MPEP 2144.05.II (Optimization) requires that a particular parameter be recognized as a result-effective variable, i.e., a variable which achieves a recognized result. The enrichment of fuel rods in an assembly is clearly a result effective variable, which achieves varying degrees of benefits. Different enrichments for these fuel rods will affect, e.g., fuel burnup and shutdown margin, but are largely predictably.

As to claim 29, a 15x15 configuration, which is intermediate to the well known 14x14 and 17x17 configurations, is another notorious PWR fuel assembly configuration.

Therefore, it would have been intuitively obvious to one having ordinary skill in the art at the time the invention was made to apply the embodiment of Fig. 4 to the intermediate 15x15 configuration to gain the advantages of said embodiment, i.e., improved reactor performance and/or burnup rate and/or ease of manufacture (see Abstract of Heketh).

### ***Conclusion***

5. This is a continuation of applicant's earlier Application with the same S/N. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE**



**FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rick Palabrica whose telephone number is 571-272-6880. The examiner can normally be reached on 6:00-4:30, Mon-Thurs.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Rick Palabrica/  
Primary Examiner, Art Unit 3663

November 2, 2009